

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A heavy duty rotary concrete mixing drum ~~capable of attachment to a vehicle, the drum~~ comprising a first end which engages a vehicle powered drive assembly which rotates said drum for mixing of said concrete and a second end from which mixed concrete is discharged; , wherein said drum is manufactured from at least one layer of plastics material, wherein the drum includes a wall having integral internal formations promote mixing and discharge of said concrete and an inner [[an]] surface which promotes mixing of the concrete, wherein the internal formations radially project toward an axial centerline of the drum and wherein the internal formations have a radial midportion having a cross-section formed entirely from one or more layers of substantially non-metallic materials.

2. (Original) A heavy duty rotary concrete mixing drum according to claim 1 wherein the drum comprises an inner layer of elastomeric material and an external structural layer.

3. (Previously Presented) A heavy duty rotary concrete mixing drum according to claim 2 wherein said inner layer includes a polyurethane elastomer.

4. (Previously Presented) A heavy duty rotary concrete mixing drum according to claim 2 wherein said external structural layer includes a fiber reinforced composite exterior.

5. (Previously Presented) A heavy duty rotary concrete mixing drum according to claim 4 wherein the wall of the drum includes fiberglass filament windings applied about said drum outside said inner layer.

6. (Original) A heavy duty rotary concrete mixing drum according to claim 5 wherein said wall includes between said inner layer and said outer structural layer a bonding layer.

7. (Previously Presented) A heavy duty rotary concrete mixing drum according to claim 1 wherein said integral internal formations comprise helical blades extending from said inner layer.

8. (Original) A heavy duty rotary concrete mixing drum according to claim 7 wherein said integral helical blades have a variable pitch dimension of between 0.5-2 meters.

9. (Previously Presented) A heavy duty rotary concrete mixing drum according to claim 2 wherein the strength of the structural layer of said drum is around 600 Mpa at a drum wall thickness of approximately 8mm.

10. (Previously Presented) A heavy duty rotary concrete mixing drum according to claim 9 wherein said at least one layer of plastics material is approximately 2-8mm thick and said fiberglass filament windings are formed from a layer of approximately 2-8mm thickness.

11. (Previously Presented) A heavy duty rotary concrete mixing drum according to claim 3 wherein an inner surface of the polyurethane drum provides wear resistance and promotes mixing of the contents of the concrete at the concrete/wall boundary layer.

12. (Previously Presented) A heavy duty rotary concrete mixing drum according to claim 6 wherein the weight of the drum is such that when full, the total weight of the plastics drum and contents is lighter than a steel drum of an equivalent size when full.

13. (Previously Presented) A heavy duty rotary concrete mixing drum according to claim 7 wherein said blades are formed by said elastomeric material and define a hollow internal cavity in each helical blade.

14. (Previously Presented) A heavy duty rotary concrete mixing drum according to claim 13 wherein said helical blades include a bonding layer adjacent said inner layer and a structural layer adjacent said bonding layer.

15. (Original) A heavy duty rotary concrete mixing drum according to claim 14 wherein said helical blades include a fibre reinforced tension member disposed in said cavity outside said structural layer and along the length of the blade.

16. (Currently Amended) A heavy duty rotary concrete mixing drum according to claim 7 wherein said ~~solid core~~ blades further include embedded therein a continuous glass fibre reinforced elastomer disposed along the length of said blade.

17. (Currently Amended) A heavy duty rotary concrete mixing drum according to claim 2 ~~wherein said layers are coloured as~~ including an intermediate polymeric layer between the inner layer and the structural layer, wherein the inner layer and the intermediate layer are differently colored so as to serve as wear indicators.

18. (Currently Amended) A heavy duty rotary concrete mixing drum according to claim 1 wherein the drum includes a wall manufactured from layers of plastics material using three base moulds, wherein the internal formations form ~~and further includes detachable or integrally attached blades which extend from an inner surface of said wall; the vans forming~~ an archimedian spiral disposed such that when the drum is rotated in a first direction the concrete contents are mixed and when the drum is rotated in a second direction, the concrete is discharged from said drum; and wherein the internal surface of the drum includes a polyurethane elastomer layer which promotes mixing of the contents of the concrete at the concrete boundary layer, and wherein the weight of the drum is such that when full, the total weight of the drum and contents is lighter than for a steel drum of an equivalent size when full.

19. (Previously Presented) A heavy duty rotary concrete mixing drum according to claim 1 wherein the drum is pear-shaped and includes a first tapering end portion having an end configured to engage the drive assembly, a second opposite tapering end portion including an opening for discharge of said concrete from said drum and a third intermediate portion extending between the first tapering end portion and the second tapering end portion.

20. (Previously Presented) A heavy duty rotary concrete mixing drum according to claim 19 wherein the wall of said drum includes an inner layer of elastomer, an

intermediate chemical bonding layer and an exterior layer of a composite of resin and high strength wound fibre reinforcement.

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89. (Currently Amended) A drum according to claim 2 wherein said inner layer has a white pigment ~~layers are colored as wear indicators~~.

90. (Previously Presented) A heavy duty rotary concrete mixing drum according to claim 7 wherein said blades are solid core along the full length of the blades.

91. (Previously Presented) A heavy duty rotary concrete mixing drum according to claim 90 wherein said solid core blades further include embedded therein a continuous glass fibre reinforced elastomer disposed along the length of said blade.

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94. (Previously Presented) The heavy duty rotary concrete mixing drum of claim 1 wherein at least a portion of the internal formations has a pitch of 2 meters.

95. (Previously Presented) The heavy duty rotary concrete mixing drum of claim 1 wherein the internal formations have a root having a radius greater than 10 millimeters.

96. (Previously Presented) The heavy duty rotary concrete mixing drum of claim 1 wherein the internal formations have a root, a tip opposite the root and a midportion between the root and the tip having a first thickness, wherein the tip has a second thickness greater than the first thickness.

97. (Previously Presented) The heavy duty rotary concrete mixing drum of claim 96 wherein the tip includes an embedded reinforcement member.

98. (Previously Presented) The heavy duty rotary concrete mixing drum of claim 96 wherein the tip includes an embedded reinforcement member.

99. (Previously Presented) The heavy duty rotary concrete mixing drum of claim 98 wherein the reinforcement member continuously extends as a single unitary body from a first axial end of the drum across an axial midpoint of the drum.

100. (Previously Presented) The heavy duty rotary concrete mixing drum of claim 99 wherein the reinforcement member continuously extends as a single unitary body proximate to a second axial end of the drum.

101. (Previously Presented) The heavy duty rotary concrete drum of claim 1 wherein the internal formations continuously extend as a single unitary body from a first axial end of the drum across an axial midpoint of the drum.

102. (Previously Presented) The heavy duty rotary concrete mixing drum of claim 1 including:

a first layer of polymeric material providing at least a portion of the inner surface of the drum; and

a second layer external to the first layer, wherein the second layer continuously extends as a single unitary body from a first axial end of the drum across an axial midpoint of the drum.

103. (Previously Presented) The heavy duty rotary concrete mixing drum of claim 102 wherein the second layer continuously extends as a single unitary body from the first axial end of the drum to a second axial end of the drum.

104. (Previously Presented) The heavy duty rotary concrete mixing drum of claim 102 wherein the second layer includes reinforced fibers.

105. (Previously Presented) The heavy duty rotary concrete mixing drum of claim 102 wherein at least a portion of the first layer continuously extends as a single unitary body from the first axial end of the drum across the axial midpoint of the drum.

106. (Previously Presented) The rotary concrete mixing drum of claim 105 wherein the first layer continuously extends as a single unitary body from the first axial end of the drum proximate to the second axial end of the drum.

107. (Currently Amended) The heavy duty rotary concrete mixing drum of claim 1 wherein the radial midportion has a cross-sectional thickness provided by a single homogenous polymeric material.

108. (Previously Presented) The heavy duty rotary concrete mixing drum of claim 107 wherein a single homogenous material is a urethane-based material.

109. (Previously Presented) The heavy duty rotary concrete mixing drum of claim 1 wherein the radial midportion is configured to deflect into a sail-shaped surface cupped to contain concrete when experiencing concrete loading.

110. (Previously Presented) The heavy duty rotary concrete mixing drum of claim 109 including a rigid tension member along a radial end portion of the internal formations.

111. (Previously Presented) The heavy duty rotary concrete mixing drum of claim 1 wherein the drum is pear-shaped and omits internal and external seams circumferentially extending about the axial center line of the drum.

112. (Previously Presented) The heavy duty rotary concrete mixing drum of claim 1 including a track ring formed from fiber reinforced plastic.

113. (Previously Presented) A heavy duty rotary concrete mixing drum having a first axial end and a second axial end, the drum comprising:

a first layer of at least one polymeric material forming at least a portion of an interior surface of the drum;

a second layer external to the first layer, wherein the second layer continuously extends as a single unitary body from the first axial end of the drum across an axial midpoint of the drum; and

a spiral mixing blade extending along the interior surface of the drum.

114. (Previously Presented) The drum of claim 113 wherein the second layer continuously extends as a single unitary body from the first axial end to proximate a second axial end of the drum.

115. (Previously Presented) The drum of any one of claim 113 wherein the first layer continuously extends as a single unitary body from one of the first axial end and the second axial end across the axial midpoint of the drum.

116. (Previously Presented) The drum of claim 115 wherein the first layer continuously extends as a single unitary body to proximate the other of the first axial end and the second axial end.

117. (Previously Presented) The drum of claim 113 wherein the second layer comprises fiber-reinforced polymeric material.

118. (Previously Presented) The drum of claim 117 wherein the first layer includes urethane-based material.

119. (Previously Presented) The drum of claim 113 wherein the spiral mixing blade is integrally formed as part of a single unitary body with the first layer.

120. (Previously Presented) The drum of claim 113 wherein at least a portion of the spiral mixing blade has a pitch of about 2.0 meters.

121. (Currently Amended) The drum of claim 113 wherein at least a portion of the spiral mixing blade continuously extends as a single unitary body from one of the first axial end and the second axial end across an axial midpoint of the drum.

122. (Currently Amended) The drum of claim 121 wherein at least a portion of the spiral mixing blade continuously extends proximate to the other of the first axial end and the second axial end.

123. (Previously Presented) The drum of claim 113 wherein the spiral mixing blade has a root, a tip and a midportion between the root and the tip, wherein at least a portion of the midportion is formed entirely from one or more layers of substantially non-metallic materials.

124. (Previously Presented) The drum of claim 113 wherein the spiral mixing blade has a root, a tip and a midportion between the root and the tip and wherein the midportion has a thickness formed by a single homogenous polymeric material.

125. (Previously Presented) The drum of claim 124 wherein the single homogenous polymeric material is a urethane-based material.

126. (Previously Presented) The drum of claim 113 wherein the spiral mixing blade includes a reinforcement member.

127. (Previously Presented) The drum of claim 126 wherein the spiral mixing blade has a tip and wherein the reinforcement member extends along the tip.

128. (Previously Presented) The drum of claim 126 wherein the reinforcement member continuously extends as a single unitary body from one of the first axial end and the second axial end across an axial midpoint of the drum.

129. (Previously Presented) The drum of claim 128 wherein the reinforcement member continuously extends as a single unitary body to proximate the other of the first axial end and the second axial end of the drum.

130. (Previously Presented) The drum of claim 113 wherein the spiral mixing blade includes a root, a tip and a midportion between the root and the tip, wherein the midportion is flexible so as to deflect into a sail-shaped surface cupped to contain concrete when experiencing concrete loading.

131. (Previously Presented) The drum of claim 113 wherein the drum omits external and internal seams circumferentially extending about an axial center line of the drum.

132. (Currently Amended) The drum of claim 113 wherein the spiral mixing blade is integrally formed as part of a single unitary body with the first layer, wherein the spiral mixing blade has a root, a tip and a midportion between the root and the tip and wherein the

midportion has a cross-sectional thickness provided by a single homogenous polymeric material.

133. (Previously Presented) The drum of claim 132 wherein the single homogenous polymeric material is a urethane-based material.

134. (Previously Presented) A heavy duty rotary concrete mixing drum, the drum comprising:

a first non-metallic layer at least partially forming an interior of the drum; and
a helical mixing blade along the interior of the drum, wherein at least a portion of the blade is integrally formed as part of a single unitary body with the first layer, the blade having a root, a tip opposite the root and a midportion between the root and the tip, wherein the midportion has a larger degree of flexibility than the root and the tip such that the midportion deforms into a sail-shaped surface cupped to contain concrete when experiencing concrete loading.

135. (Previously Presented) The drum of claim 134 wherein the tip includes an embedded reinforcement member.

136. (Previously Presented) The drum of claim 134 wherein the root has a radius greater than 10 mm.

137. (Previously Presented) The drum of claim 134 wherein at least a portion of the blade has a pitch of about 2 meters.

138. (Previously Presented) The drum of claim 134 wherein the midportion has a cross-section formed from a single homogenous polymeric material.

139. (Previously Presented) The drum of claim 138 wherein the single homogenous polymeric material is a urethane-based material.

140. (Previously Presented) The drum of claim 134 wherein the midportion is formed entirely from one or more layers of substantially non-metallic materials.

141. (Previously Presented) The drum of claim 134 wherein the midportion has a first thickness and wherein the tip has a second thickness greater than the first thickness.